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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/713,660

11/14/2003

Frank G. Belmonte

37,481

9847

4249

7590

06/22/2006

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EXAMINER

OH, TAYLOR V

ART UNIT

PAPER NUMBER

1625

DATE MAILED: 06/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/713,660	<b>Applicant(s)</b> BELMONTE ET AL.	
	<b>Examiner</b> Taylor Victor Oh	<b>Art Unit</b> 1625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 29 and 30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

The Status of Claims:

Claims 1-30 are pending.

Claims 1-28 have been rejected.

Claims 29-30 have been withdrawn .

DETAILED ACTION

1. Claims 1-28 are under consideration in this Office Action.

Priority

2. None.

Drawings

3. The drawings filed on 11/14/03 are accepted by the examiner.

***Election/Restrictions***

Applicant's election with traverse of Group I, namely Claims 1-28 on 4/14/06 is acknowledged.

Claims 29-30 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected Group II, there being no allowable generic or linking claim.

Applicants argue in the followings:

Art Unit: 1625

1. US 4,394,299 to Pusksa is completely irrelevant to the issue of separateness and distinctness of the process and intermediate product claims of the subject application;
2. Pusksa is silent about any unreacted substituted benzene or other aromatic feed materials to oxidation;
3. Pusksa does not disclose the following composition as shown in claim 30 :

30. A composition for the product from the first oxidation stage on a solvent free basis as a percentage of the total product mixture comprises from about 5.0 to about 85.0 weight percent of terephthalic acid, from about 2.0 to about 20.0 weight percent of 4-carboxybenzaldehyde, from about 0.0 to about 3.0 weight percent of hydroxymethylbenzoic acid, from about 5.0 to about 65.0 weight percent of p-toluic acid, from about 0.0 to about 30.0 weight percent of p-tolualdehyde, and from about 0.0 to about 35.0 weight percent of p-xylene.

With respect to applicants' arguments, the examiner has considered them; however, they are not persuasive in view of the newly applied prior art, Allen et al (US 4,393,264).

Unlike the claimed invention, Allen et al expressly discloses the composition obtained from the non-catalytic pyrolysis of benzene di- and tri-carboxylic acids, which is the claimed compositions as in claims 29-30 in the followings (see col. 8, lines 5-53):

**TABLE IV**

<b>COMPONENTS OF RESIDUE FREE OF WATER AND ACETIC ACID</b>	
Terephthalic Acid	26.4%
p-Toluic Acids	20.8%
p-Formylbenzoic acid	9.1%
p-Tolualdehyde	0.51%
Terephthalaldehyde	1.20%
p-Methylbenzyl Alcohol	2.06%
Reaction By-Products	36.9%
Co-Products	4.12%

Another such residue has the composition including the catalyst components: cobalt, manganese and bromine and metals of corrosion as shown in TABLE V to follow.

**TABLE V**

<b>RESIDUE FROM TEREPHTHALIC ACID MANUFACTURE ON ACETIC ACID AND WATER-FREE BASIS</b>	
<b>Component</b>	<b>Weight Percent</b>
Phthalic Acids	19.0
Benzoic Acid	14.8
Toluic Acids	26.7
Methyl Phthalic Acids	2.65
Trimellitic and Trimessic Acids	4.32
4-Carboxybenzaldehyde	9.09
Tolualdehydes	0.40
Benzaldehyde	0.004
Terephthalaldehyde	0.27
Methylbenzyl Acetate	0.02
Formyl Acetate	0.15
Benzylbenzoate	0.07
Phthalide	2.04
Co-Products	4.24
Cobalt	1.51
Manganese	2.53
Bromine	2.20
Iron	0.09
Aluminum	0.00022
Calcium	0.02
Chromium	0.007
Copper	0.0001
Magnesium	0.0028
Molybdenum	0.0035
Sodium	0.30
Nickel	0.0052
Silica	0.0025
Anion of Metals	9.04

From this, Allen et al does show that the same product as claimed can be made by another and materially different process (MPEP § 806.05(f)). Thus, Inventions

Art Unit: 1625

I and II are distinct and separate inventions, The examiner has a right to restrict both groups as two distinct, unrelated, different classes. The search is a burden whether or not they are so closely related to their searches. Furthermore, M.P.E.P. Section 808.02 gives legitimate reasons for the Examiner to insist on restriction such as the process vs. composition claims for the case of separate classification, which indicates that "each distinct subject has attained recognition in the art as a separate subject for the inventive effort, and also a separate field of search."

The requirement is still deemed proper and is therefore made FINAL.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, the phrases, "its corresponding derivative", "the predetermined total amount", "acid derivative product", "substantially", and "the remainder" are recited. The expressions of "derivative", "predetermined", "acid derivative", "substantially", and "the

Art Unit: 1625

remainder” are vague and indefinite because the skilled artisan in the art would not understand clearly what is meant by each of them; the specification does not elaborate what is meant by each term. Therefore, an appropriate correction is required.

In claims 1 and 2, the phrase, “ the disubstituted benzene comprises” and “ catalyst components comprising” are recited. The expressions of “ comprises ” or “ comprising ” is vague and indefinite because the term “ comprising ” do not exclude the presence of other than one or ones recited. Ex parte Muench, 79 USPQ 92 (PTO BD. App. 1948). Therefore, an appropriate correction is required.

In claims 12 ,16, and 28, the phrase, “ acid derivative” is recited. The expression of “derivative” is vague and indefinite because the skilled artisan in the art would not understand clearly what is meant by that; the specification does not elaborate what is meant by the term. Therefore, an appropriate correction is required.

In claim 26, the phrase, “substantially” is recited. The expression of “substantially” is vague and indefinite because the skilled artisan in the art would not understand clearly what is meant by the term; the specification does not elaborate what is meant by the term. Therefore, an appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein



Art Unit: 1625

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baldwin et al (US 3,092,658) in view of D.M. Lewis et al (US 3,406,196).

Baldwin et al teaches a countercurrent oxidation system for oxidizing substituted aromatic hydrocarbons so as to produce carboxylic acids.

It is suitable for oxidizing mixed xylenes with an oxygen concentration of 8 to 9 percent (see col. 2. lines 3-4) in the presence of oxidizing catalyst selected from the group consisting of manganese, cobalt, nickel, chromium, vanadium, cerium or mixtures



Art Unit: 1625

and a bromine promoter (see col. 3 , lines 31-35) in the range of 1:10 to 10:1 atoms of catalyst metal per atoms of bromine (see col. 3, lines 42-46) to produce the mixed dicarboxylic acids in such a form that they may be separated into phthalic acid, terephthalic acid (see col. 1 ,lines 35-40). In addition, the preferred mixed metal catalysts are mixtures of manganese with cobalt acetate with a proportion of 1 to 2 parts by weight of manganese salt per part by weight of the other metal compound (see col. 3 ,lines 50-55).

**In a staged three vessel countercurrent oxidation system the first stage should be operated at 50-300, e.g. 175 p.s.i., 320-420, e.g. 375° F., with a 1:1 to 5:1 acetic acid to hydrocarbon ratio and for a time of about .1 to 1 hour, e.g. 30 minutes. The second stage should be at a higher pressure than the first, i.e. 100-400 or about 300 p.s.i., at approximately the same temperature, e.g. 340-420 or about 380° F., with about the same solvent ratio and contact time as the first stage but preferably with a somewhat higher oxygen concentration. The last stage should be at the highest pressure, e.g. 200-500 or about 400 p.s.i., the highest temperature, e.g. 360-440 or about 400° F., and at the highest oxygen concentration, preferably air at the inlet side but in amounts to avoid exceeding 8 percent oxygen in the off-gas therefrom. (see col. 2 ,lines 30-45).**

Furthermore, the stage-wise continuous counter current oxidation system will avoid explosion hazards and result in the attainment of product quality (see col. 1 ,lines 41-44).

Moreover, some water and solvent are recycled from the each of the latter reactors to the preceding reactor along with the gas stream (see col. 4 ,lines 46-49) as shown in fig 2 ( a front page ).

Art Unit: 1625

The instant invention, however, differs from the prior art in that 7 to 60 wt percent of the one disubstituted benzene is introduced ; the degree of conversion of the disubstituted benzene to partially oxidized disubstituted benzene and acid derivative is from 60 to 99.95 wt percent.

D.M. Lewis et al teaches the oxidation of polyalkyl aromatic to polycarboxylic acid in the following steps (see col. 3 ,lines 40-65) :

(a) oxidizing polyalkyl aromatic compound in a first stage until a major proportion, preferably about from 60 to 100% by weight, of said compound is oxidized to a product in which the polycarboxylic acid obtained by conversion of all the alkyl groups of the compound being oxidized to carboxylic acid groups is present in minor proportion, i.e., less than 50% by weight thereof, and partially oxidized compounds formed by conversion of less than all the alkyl groups of the compound being oxidized to carboxylic acid groups are present in major proportion, i.e., more than 50% by weight thereof, said first-stage oxidation being initiated at a temperature of about from 100 to 225° C., in the presence of 0 to about 15% of water based on the weight of the reaction mass and conducted thereafter at a temperature in said range, in the presence of less than about 50%, and preferably less than about 30%, of water based on the weight of the reaction mass; and

(b) oxidizing said partially oxidized compounds from (a) to said polycarboxylic acid in a second stage, said second-stage oxidation being conducted at a temperature higher, preferably at least about 25° C. higher, than that in (a) and between about 175 and 350° C., the solids content of the reaction mass in (b) being maintained below about 70% by weight by the addition of water thereto.

In addition, when the reaction temperature is sufficiently high , at least 60 % or 95 to 100 % of the polyalkyl aromatic starting compound is converted into the oxidized product (see col. 5 ,lines 11-13). Overall polycarboxylic acid yields, based on polyalkyl

Art Unit: 1625

aromatic starting compound , of the order of 85 % and 90 % or higher have been demonstrated with great consistency (see col. 9 ,lines 72-75).

Both prior art processes are commonly involved with the oxidation of the substituted aromatic hydrocarbons so as to produce the corresponding carboxylic acids under similar reaction conditions (catalyst composition and reaction temperature).

Baldwin et al expressly teaches the countercurrent oxidation system for oxidizing substituted aromatic hydrocarbons so as to produce the corresponding carboxylic acids; similarly, D.M. Lewis et al does teach the oxidation of polyalkyl aromatic to polycarboxylic acid at the successively increased oxidation temperature. Furthermore, Baldwin et al has offered guidance that the stage-wise continuous counter current oxidation system will avoid explosion hazards and result in the attainment of product quality (see col. 1 ,lines 41-44) and D.M. Lewis et al does point out that the high reaction temperature will promote a high conversion to the desired product. Therefore, it would have been obvious to the skilled artisan in the art to be motivated to incorporate the teaching of D.M. Lewis et al into the Baldwin et al process in order to achieve a high conversion to the desired product.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Taylor Victor Oh whose telephone number is 571-272-0689. The examiner can normally be reached on 8:30-5:00.

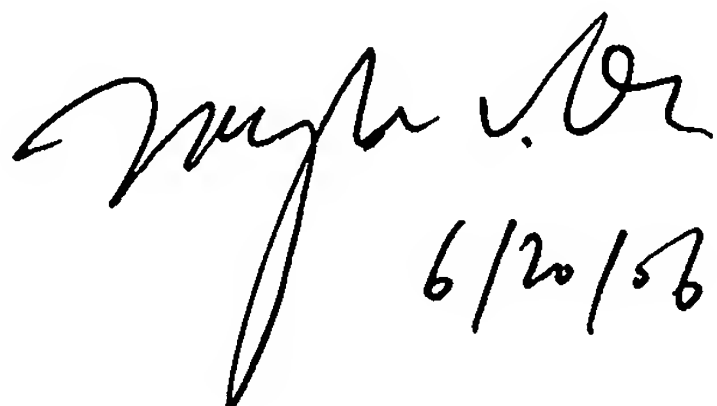
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas McKenzie can be reached on 571-272-0670. The fax phone

Art Unit: 1625

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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6/20/06